

REMARKS

Claims 1-3 and 6-13 are pending in the current application. Claims 4-5 are canceled. Claims 1-3 and 6-10 are amended by this amendment. Claims 12-13 are added by this amendment.

Claim Objections

The Examiner objects to claims 1-3 and 6-9 because of the use of terms “optimum voltage,” “optimum voltage values,” and “voltage values.” The Examiner feels that deciding on a uniform term for all of these claims would be helpful for readability of the claims. Applicant respectfully submits that claim 1 is amended, however, Applicant maintains that “optimum applied voltages” and “values of optimum applied voltages” as they appear in amended claim 1 are distinct terms. Applicant submits “optimum applied voltages” means voltages which may be applied to an electrode. The term “values of optimum applied voltages” means numeric values of the optimum applied voltages.

The Examiner objects to claim 1 because of the use of the phrase “each of which optimum voltage is applied to an electrode having.” Applicant respectfully submits the noted portion of claim 1 is amended in the manner suggested by the Examiner, however, Applicant maintains the use of “which” for purposes of proper grammar.

The Examiner objects to claim 10 because of the use of the term “a parasite capacitance” in lines 6-7. Applicant respectfully submits the claim 10 is amended in the manner suggested by the Examiner.

In view of the above, Applicant respectfully requests the objections to the claims be withdrawn.

Claim Rejections under 35 U.S.C. § 112

Claims 6-8 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. Applicant respectfully traverses the rejection.

In regards to the language “the optimum applied voltage is determined in accordance with a lowest value and a voltage width of the optimum applied voltage” the Examiner asserts it is unclear what is being measured or considered to generate a lowest value. The Examiner asserts claims 7 and 8 recite “a highest value” and “a center value,” respectively, but it is unclear what is being measured or considered to generate the highest or center values.

Applicant respectfully submits claims 6-8 are amended to address the Examiner’s rejections. Applicant submits “optimum applied voltage” may mean a voltage obtained by shifting a target voltage by a predetermined constant voltage. The target voltage may be a voltage which is applied to the electrode where the voltage waveform is to be shifted. In the case of an alternating voltage, “lowest value” may refer to the relatively lowest value of the voltage during one period. Similarly, “highest value” may refer to the relatively highest value of the voltage during one period, and “center value” may refer to the relatively center value of the voltage during one period. Therefore, in claim 6, generation of the “lowest value” may refer to the relatively lowest value of the voltage before shift and the variation ΔV . Similarly, in claim 7, generation of the “highest value” may refer to the relatively highest value of the voltage before shift and the variation ΔV . Similarly, in claim 8, generation of the “center value” may refer to the relatively center value of the voltage before shift and the variation ΔV .

Further, the Examiner asserts it is unclear in light of the specification exactly how an optimum voltage value could be calculated using its own width. Applicant respectfully submits claims 6-8 are amended to address the Examiner’s assertion, and Applicant directs the Examiner

to the specification at page 17, line 23 to page 18 line 2. Accordingly, Applicant respectfully submits claims 6-8 particularly point out and distinctly claim the subject matter which Applicant regards as the invention.

In view of the above, Applicant respectfully requests the rejections under 35 U.S.C. § 112, second paragraph, be withdrawn.

Claim Rejections under 35 U.S.C. § 103

Claims 1-3 and 9-11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Noguchi et al. (U.S. Pat. No. 7,084,849, herein Noguchi) in view of Koyama (U.S. Pat. No. 6,600,465, herein Koyama). Applicant respectfully traverses the rejection.

Noguchi discloses a dual mode liquid crystal display device 500 having a reflecting mode and a transparent mode.¹ Noguchi discloses that there is a Difference between the potential difference “B” of the potential of the electrode in the reflecting region 524 and the potential difference “A” of the potential of the electrode in the transparent region 522.² In order to compensate for the Difference, the voltage which is applied to the electrode 512 in the reflecting region 524 in the reflecting mode and the voltage which is applied to the electrode 512 in the transparent region 522 in the transparent mode are set to values which are different from each other.³ In particular, the alternating voltage applied to the electrode 512 in the reflecting region 524 in the reflecting mode is set to the alternating voltage applied to the electrode 512 in the transparent mode 524 plus a DC voltage.⁴ However, at the electrode 512 in the reflecting region 524 in the reflecting mode, the center level of the alternating voltage and the center level of the

¹ Noguchi at Col. 25-26, Ll. 14-27, FIGS. 14-15, and claim 15.

² Id.

³ Id.

⁴ Id.

common electrode voltage do not coincide, and therefore, a flicker may still be observed.⁵ In order to prevent the flicker in Noguchi, an offset is added to the alternating voltage for the electrode 512 in the reflecting region 524 so that its voltage is shifted totally and that the center level coincides with the center level of the common electrode voltage.⁶

Applicant respectfully submits amended claim 1 differs from Noguchi in that the reasons the center levels do not coincide in claim 1 are different than the above noted reasons the center levels do not coincide in Noguchi. Applicant's claim 1 recites inter alia "each pixel has a switching element for switching ON and OFF application to the pixel of the source electrode voltage, in which a value of the source electrode voltage is set to a value which compensates a variation of the source electrode voltage due to parasitic capacitance of the switching element when the switching element is OFF."

For example, there may be a parasitic capacitance between the gate and the drain in the switching element which switches on/off application of the voltage applied to the source electrode into the pixel. Because of the parasitic capacitance, if the switching element, e.g. the gate, turns off, the voltage applied to the source electrode may vary by the difference ΔV . In order to compensate for the difference ΔV , the value of the voltage applied to the source electrode is set to the original value plus the difference ΔV . However, the center level of the voltage applied to the source electrode and the center level of the common electrode voltage do not coincide. Therefore, a flicker may occur.

In order to prevent the flicker, an offset is added to the voltage applied to the source electrode so that the voltage applied to the source electrode is shifted totally and that its center level coincides with the center level of the common electrode voltage. Therefore, Applicant respectfully submits the reasons the center levels do not coincide are different between the

⁵ Id.

reference Noguchi and the claim 1. Accordingly, Noguchi does not disclose at least “each pixel has a switching element for switching ON and OFF application to the pixel of the source electrode voltage, in which **a value of the source electrode voltage is set to a value which compensates a variation of the source electrode voltage due to parasitic capacitance of the switching element** when the switching element is OFF” as required by amended claim 1.

Regarding Koyama, even assuming arguendo that Koyama could be combined with Noguchi (which is not admitted), Koyama would still fail to make up for at least the previously mentioned deficiencies of claim 1 with respect to Noguchi. Accordingly, claim 1 is patentable over the alleged combination of references, even assuming arguendo that they could be combined.

Furthermore, Koyama discloses electric charge corresponding to the transmissivity recognized by the image sensor 105 is converted into digital form and held in the correcting value storage device 103.⁷ The MPU 401 reads the corresponding value in the correcting value storage device 103[, and] [t]his read value is added to the digital image signal, thus creating a correcting digital image signal.⁸ Therefore, in Koyama, the difference, between the value of the voltage which is to be applied to the pixel and the value of the voltage which has been really applied to the pixel, is stored. However, in claim 1 the value of the voltage whose center level has been adjusted is stored and the voltage is applied to the pixel. Therefore, Koyama does not disclose at least “storage means for storing values of optimum applied voltages” as required by amended claim 1.

Accordingly, Applicant respectfully submits claim 1 is patentable for at least the reasons discussed above. Further, Applicant respectfully submits claims 2-3 and 6-11, which depend

⁶ Id.

⁷ Koyama at Col. 3, Ll. 41-44.

⁸ Id. at Col. 3., Ll. 47-50.

from claim 1, are patentable for at least the same reasons as claim 1 as well as on their own merits.

Applicant further addresses the rejection regarding claim 2, noting that claim 2 is patentable for at least the reasons previously expressed regarding claim 1. Amended claim 2 recites inter alia “the storage means, which are connected to a common electrode drive circuit, are for storing a plurality of values of the optimum applied voltages for shifting a voltage waveform of a voltage applied to the common electrode, respectively for the display modes.” Applicant respectfully submits that if the center levels of the source electrode voltage and of the common electrode voltage coincide in the reflecting mode by shifting the common electrode voltage waveform in Noguchi, the center levels of the source electrode voltage and of the common electrode voltage coincide in the transparent mode, which used to coincide, will fail to coincide, inversely. Therefore, Noguchi further fails to disclose “storing a plurality of values of the optimum applied voltages for shifting a voltage waveform of a voltage applied to the common electrode, respectively for the display modes” as required by claim 2.

New Claims

Applicant respectfully submits that new claims 12 and 13, which depend from claim 1, are patentable at least for the reasons discussed above in regards to claim 1 as well as on their own merits. Further, Applicant respectfully submits the remarks below regarding new claims 12 and 13.

In Koyama, the value of the voltage which has been really applied to the pixel is calculated by measuring the transmittance of the liquid crystal with the image sensor 105

installed in the display device.⁹ The difference between the value of that voltage and the value of the other voltage applied externally is stored.¹⁰ Therefore, Koyama further does not disclose “the storage means stores the values of the optimum applied voltages only once during manufacture of the display device” as required by claim 12.

Noguchi discloses only that the center of the source electrode voltage in the reflecting mode is shifted.¹¹ Therefore, Noguchi further does not disclose “the optimum applied voltages are different from each other with respect to each display mode” as required by claim 13.

⁹ Id. at Col. 3, Ll. 39-40.

¹⁰ Id. at Col. 3, Ll. 41-44.

¹¹ Noguchi at Col. 25-26, Ll. 14-27, FIGS. 14-15, and claim 15.

CONCLUSION

Accordingly, in view of the above amendments and remarks, reconsideration of the objections and rejections and allowance of each of claims 1-3 and 6-13 in connection with the present application is earnestly solicited.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicant(s) hereby petition(s) for a one (1) month extension of time for filing a reply to the outstanding Office Action and submit the required \$120 extension fee herewith.

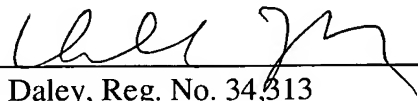
Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Donald J. Daley at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 08-0750 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

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By


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